

**REMARKS****Status of the Claims**

Claims 3-5, 7-12 and 14-26 are pending in the application. Claims 3 and 12 are currently amended. Claims 23-26 are added. Claims 23 and 25 mirror claims 3 and 12, respectively, with the added limitation of "wherein deprotonation is caused only by excitation by said laser beam." Claims 24 and 26 mirror claims 3 and 12, respectively, except for the use of the transitional phrase "consisting essentially of" rather than the term "comprising." Reconsideration and allowance of all of the pending claims are respectfully requested.

New matter is not being added to the application by way of this amendment. Support for the recitations to claims 3 and 12 as well as new claims 23-26 can be found, *inter alia*, in the examples of the present specification. Accordingly, no new matter is added, and entry of this amendment is respectfully requested.

Applicants respectfully request reconsideration of all pending claims based upon the amendments and arguments below.

**Rejections under 35 U.S.C. § 103(a)**

1) Claims 3, 4, 6, 7, 11-14, 18, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziessel (*J. Am. Chem. Soc.* (1993), 115, 118-127) in view of Maeda et al. '426 (JP 2002-020426).

Applicants respectfully assert that Ziessel in view of Maeda et al. '426 does not disclose each and every element of independent claims 3 or 12. Therefore, Ziessel in view of Maeda et al. '426 does not render obvious claims 3 and 12.

***The Present Invention***

The present invention is based on the discovery that the metal hydride complex represented by formula (I) in claim 3 has the property that acid is produced upon excitation, and the resulting solution then becomes acidic. In the present invention, the generation of acid upon irradiation by a laser beam means that H<sup>+</sup> is generated through deprotonation of the metal

hydride complex upon excitation. See page 5, line 16 - page 6, Scheme 1 of the present specification. The language of the newly added claims is addressed separately below.

*Distinctions between the present invention and the prior art*

As amended, claims 3 and 12 recite, *inter alia*, the step of “(a) providing a metal hydride complex of the following formula (I) dissolved in a solution consisting essentially of a solvent.”

In stark contrast, neither Ziessel nor Maeda et al. ‘426 disclose a solution that consists essentially of a solvent and a metal hydride complex. The phrase “consisting essentially of” limits the scope of a claim to the specified materials and those that do not materially affect the basic and novel characteristics of the claimed invention. Applicants respectfully submit that the cited references disclose additional materials in the solution of a solvent and a metal hydride complex that would materially affect the basic and novel characteristics of the present invention. For example, Ziessel discloses the addition of materials such as  $\text{AgCF}_3\text{SO}_3$  (page 119, second column) or bpy or phen substituted ligand (page 120, first column).

Ziessel at page 125, right column, mentions irradiating the compound with light to produce an intermediate D. However, this step describes only the production of  $\text{H}^-$  from the metal hydride complex and fails to disclose deprotonation by changing from Intermediate D directly to Intermediate C.  $\text{H}^+$  is never generated in Ziessel as shown in Scheme II. That is, if  $\text{H}^+$  is generated from the metal hydride complex, then  $\text{H}_2$  cannot be generated, and the reaction cycle of Scheme II cannot occur.

Moreover, Ziessel fails to disclose deprotonation of the metal hydride complex and fails to disclose that the metal hydride complex can work as a photoacid generator. Thus, even if Ziessel were combined with Maeda et al. ‘426, it would be non-obvious that the metal hydride complex would have the properties of a photoacid generator to generate  $\text{H}^+$  by irradiation with a laser beam.

Thus, Applicants respectfully submit that the cited references do not render the present invention obvious because the references provide no disclosure, reason, or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed.

2) Claims 10 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziessel in view of Maeda et al. '426 and in further view of Lenges et al. (*Organometallics* (2000), 19, 1247-1254).

3) Claims 8, 9, 15, and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziessel in view of Maeda et al. '426 and further in view of Amendola et al. '643 (US 2002/0083643).

4) Claims 19, 21, and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ziessel in view of Maeda et al. '426 and in further view of Abura et al. (*J. Am. Chem. Soc.* (2003), 125, 4149-4154).

Applicants respectfully traverse each of these rejections for the following reasons. Reconsideration and withdrawal of these rejections are respectfully requested.

*Distinctions between the present invention and the prior art*

As discussed above, Ziessel in view of Maeda et al. '426 does not disclose or suggest each and every aspect of independent claims 3 and 12. Applicants respectfully submit that Lenges et al., Amendola '643, and Abura et al. do not overcome the deficiencies of these references.

To establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be disclosed by the prior art. As discussed above, the combination of references fails to disclose all the claim limitations of independent claims 3 and 12, and those claims dependent thereon. Therefore, a *prima facie* case of obviousness has not been established, and withdrawal of the outstanding rejections is respectfully requested.

In addressing all of the obviousness rejections recited above, MPEP 2141 sets forth the guidelines in determining obviousness. First, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

- (a) determining the scope and content of the prior art;

- (b) ascertaining the differences between the prior art and the claims in issue;
- (c) resolving the level of ordinary skill in the pertinent art; and
- (d) evaluating any evidence of secondary considerations.

*Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

Second, the Examiner has to provide some rationale for determining obviousness. MPEP 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

- (a) combining prior art elements according to known methods to yield predictable results;
- (b) simple substitution of one known element for another to obtain predictable results;
- (c) use of known technique to improve similar devices (methods, or products) in the same way;
- (d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- (e) “obvious to try” – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success
- (f) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

As the MPEP directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. See MPEP 2143.03.

For the reasons given above, the combination of references does not render the present invention obvious because the cited references do not disclose at least one feature of the present invention and its effects. Furthermore, the cited references or the knowledge in the art provide no reason or rationale that would allow one of ordinary skill in the art to arrive at the present invention as claimed. Any contentions of the USPTO to the contrary must be reconsidered at present.

### **Newly Proposed Claims 23-26**

Applicants have newly proposed claims 23-26 in an effort to further define the scope of protection owed to Applicants. Applicants respectfully submit that claims 23-26 are allowable for the reasons given above.

Furthermore, claims 23 and 25 recite, *inter alia*, that “deprotonation is caused only by excitation by said laser beam.” Claims 24 and 26 recite a method consisting essentially of three defined steps, which do not include the presence of CO or H<sub>2</sub>O.

In stark contrast, Ziessel discloses a homogeneous water gas shift reaction represented by equation (1) on page 118 using a cationic iridium complex, i.e., the reaction mechanism for which the presence of CO and H<sub>2</sub>O is essential. Accordingly, Ziessel never discloses that the metal hydride complex generates H<sup>+</sup> only by irradiation of the laser beam to the metal hydride in the absence of CO and H<sub>2</sub>O.

As such, Applicants respectfully assert that claims 23-26 clearly define over the prior art of record, and an early action to this effect is earnestly solicited.

### **CONCLUSION**

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case clearly indicating that each of claims 3-5, 7-12 and 14-26 are allowed and patentable under the provisions of title 35 of the United States Code.

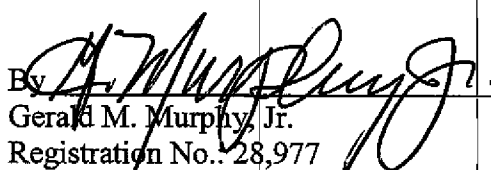
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad M. Rink, Reg. No. 58,258 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: November 10, 2008

Respectfully submitted,

By

  
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